Ernest Orlando Lawrence
Berkeley National Laboratory

ALS Integrated Safety Management Plan

PY 2006

July/August 2005

Advanced Light Source Division

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Advanced Light Source
Integrated Safety Management Plan

I. Introduction

The ALS Integrated Safety Management (ISM) Plan has been written to implement the Integrated Safety Management System (ISMS) for the division. The ISMS, taken from DOE 450.4, Safety Management Policy, sets forth 7 principles and 5 core work functions. This plan articulates those principles and core work functions specifically for the ALS Division. The Laboratory's ES&H policies and requirements are established in the RPM, Pub 3000, and the OAP. These publications establish line management responsibilities and define authorities and authorizations. The ISM Plan, referred to as the Plan, establishes the fundamental management strategy that will ensure that all institutional Environment, Safety and Health policies and procedures are implemented. The Plan will be reviewed annually as part of the Division's self assessment report. Based on management line management input, assessments, occurrences, lessons learned and other feedback mechanisms, the Plan will be modified as necessary to assure that ES&H continues to be effectively implemented within the Division.

II. Institutional Guiding Principles & Core EH&S Functions

The Ernest Orlando Lawrence Berkeley National Laboratory is a national resource, located on land belonging to the Regents of the University of California and operated with funds furnished mostly by the U. S. Department of Energy. The staff and management of the Berkeley Lab have been entrusted to function as stewards of this national resource. As stewards of this public trust, the staff and management must protect the public's interest and investment in the people, the land and environment, the equipment and facilities, and the intellectual property that make up the Berkeley Lab. This stewardship includes a responsibility to protect the health of the public and the workers, and to maintain the confidence of Congress, the public in general, and the people who work at the Laboratory.

In light of this responsibility, the Berkeley Lab commits itself to perform all work safely, in a manner that strives for the highest degree of protection for employees, participating guests, visitors, subcontractors, the public, and the environment, commensurate with the nature and scale of the work. In the context of this plan, safety refers to all environment, health and safety considerations. In addition, the Berkeley Lab seeks continuous improvement or sustained excellence in the quality of all environment, health and safety efforts. To achieve these goals, the Berkeley Lab has adopted the following principles, which are reflected in the detailed policies and procedures of the Laboratory. Principal investigators, managers and supervisors are expected to incorporate these principles into the management of their work activities. While these principles apply to all work, the exact implementation of these principles is flexible and can be tailored to the complexity of the work and the severity of the hazards and environmental risks.

1. Line Management Responsibility for EH&S. Line management is responsible for the protection of the public, the workers, and the environment. More specifically, Laboratory line managers are responsible for integrating ES&H into work and for ensuring active communication up and down the management line and with the workforce.

2. Clear Roles and Responsibilities. Clear and unambiguous lines of authority and responsibility for ensuring EH&S are established and maintained at all organizational levels within the Laboratory, and for work performed by its contractors. At the Berkeley Lab, this principle is manifested in contract language, position descriptions, PRD reviews and work authorization documents.

3. Competence Commensurate with Responsibilities. Personnel possess the experience, knowledge, skills, and abilities that are necessary to discharge their responsibilities. Berkeley Lab management takes steps to ensure the appropriate depth and breadth of technical talent in EH&S is available and that the Laboratory has in place the means for periodically evaluating competencies. Competence includes training, experience and fitness for duty.

4. Balanced Priorities. Resources are effectively allocated to address EH&S, programmatic, and operational considerations. Protecting the public, workers, and the environment is a priority whenever activities are planned and performed.

5. Identification of EH&S Standards and Requirements. Before work is performed, the associated hazards are evaluated and an agreed upon set of standards and requirements are established which, if properly implemented, provide adequate assurance that the public, workers and the environment are protected from adverse consequences. At the Berkeley Lab this is accomplished through periodic review of the agreed upon set of standards developed using the Work Smart Standards protocol. Results of Self-Assessment roll-ups, planned EH&S Division reviews and other independent or external reviews will be considered during this review. The appropriateness of the current standards set will be established at least annually.

6. Hazard Controls Tailored to Work Being Performed. Administrative and engineering controls to prevent and mitigate hazards are tailored to the work and associated hazards being performed. The Berkeley Lab recognizes that tailoring requires judgment to be exercised at the appropriate decision level.

7. Operations Authorization. The conditions and requirements to be satisfied for operations to be initiated and conducted are clearly established and agreed upon. Chapter six of PUB-3000 outlines a method for ensuring the form and content of authorizations. Examples for the Berkeley Lab include Radiation Work Authorizations (RWAs) and Activity Hazard Documents (AHDs), Safety Analysis Document (SAD) for the NTLF and HWHF, etc. another form of authorization that exists for the Lab is the site-wide Environmental Impact Report (EIR). The Lab conducts an EIR review during renewal of the 5-year ODE/UC Contract.

These Guiding Principles are implemented through the following Core EH&S Functions, which must become a part of every aspect of work at the Laboratory:

1. Work Planning - Clear definition of the tasks that are to be accomplished as part of any given activity.

2. Hazard and Risk Analysis - Analysis and determination of the hazards and risks associated with any activity, in particular risks to employees, the public, and the environment

3. Establishment of Controls - Controls that are sufficient to reduce the risks associated with any activity to acceptable levels. Acceptable levels are determined by responsible line management, but are always in conformance with all applicable laws and Work Smart Standards.

4. Work Performance - Conduct of the tasks to accomplish the activity in accordance with the established controls.

5. Feedback and Improvement - Implementation of a continuous improvement cycle for the activity, including incorporation of employee suggestions, Lessons Learned, and employee and community outreach, as appropriate.

These Core EH&S Functions apply at all levels of the Laboratory - at the institutional level, the division or department level, and at the level of individual projects or work activities. This plan describes how these core functions are addressed at these three levels at the Berkeley Lab, and how activities involving Laboratory contractors are managed for environment, health and safety concerns.

The Guiding Principles and the Core EH&S Functions are closely related. Each level of organization at the Laboratory will be assessed by determining (1) how each of the Core EH&S Functions are being performed at every level, and (2) how well each of the Core EH&S Functions reflects the Guiding Principles. The self-assessment criteria, which are published each year, will be written to evaluate progress and successful implementation of ISMS.

III. Accountability

The Division Director is responsible and accountable for assuring that all ALS activities are carried out in a safe manner, in accordance with all Laboratory requirements. Program Heads, Group Leaders, and individual contributors are expected to identify hazards, implement controls, and increase general employee awareness of workplace ES&H issues. Division supervisory personnel are responsible and accountable to the Division Director for assuring that all activities are carried out in a safe manner, and in accordance with all of the Laboratory EH&S requirements. While this responsibility and accountability cannot be delegated, all Division employees are responsible for conducting themselves safely at all times. Safe conduct includes adherence to all institutional ES&H policies and procedures as a condition of employment. It is the responsibility of the ALS Division supervisory personnel to ensure all participating guests, subcontractors, and visitors know and follow the safety requirements that apply to their work while at the ALS. Managers, PI's, and supervisors are responsible for the safety of contracted work by assuring qualified contractors are selected, hazards are identified, and work performed at the ALS is performed safely.
The EH&S Coordinator oversees the Division ES&H program. At the ALS, the Division EH&S Coordinator is a full-time professional. The ALS has a matrixed radiation technician. The ES&H Administrator functions are performed by AFRD personnel matrixed part-time to ALS.

The EH&S Liaison is invited to the meetings of the ALS ES&H Committee. The EH&S Liaison provides technical support to ALS operations and coordinates requests for additional EH&S services.

The Division is divided into Groups concentrating on certain areas of operations and/or research. Each Group is headed by a Group Leader who reports to the Division Head and is responsible for ensuring that work performed by members of the group is conducted in accordance with applicable QA and ES&H programs, procedures, and requirements.

All supervisors (including Principal Investigators) are responsible for ensuring work is planned considering ES&H risks, all assigned employees are trained in ES&H responsibilities appropriate to the tasks performed, and work is performed in accordance with all applicable ES&H work authorizations and requirements.

All ALS personnel (including ALS employees, matrixed employees, temporary employees, and students) are assigned to a QUEST team, with the exception of short-term personnel. Persons whose participation in work activities at ALS are anticipated to occur over a period of less than 90 days may be included in QUEST team activities as determined by the Division Head. Each QUEST team has charge of self-assessment for the workspace of it members.

Matrixed Personnel

Technical and administrative personnel from other Divisions are matrixed to ALS, and ALS personnel are matrixed to other Divisions. Matrix customers, Home division supervisors, and matrixed employees talk to each other about job hazards and ES&H training requirements for the work to be done in the matrix assignment.

It is the responsibility of the originating or approving engineer to ensure that design documents are processed in accordance with Engineering Division safety procedures.

The Home Division is responsible to ensure that its employees are knowledgeable, and trained, as necessary, in the basic environment, safety and health policies and procedures of the Laboratory. Matrix customer supervisors may request specific or unique training for Matrix personnel assigned to their unit, and may provide on-the-job ES&H training specific to the assignment. Home division supervisors identify and develop appropriate training plans for matrixed personnel, including ensuring the matrixed employee's ES&H Training Profile requires training appropriate to the hazards of his/her current assignment. The Job Hazard Questionnaire or ES&H Training Profile

for employees who are matrixed to or from ALS must be reviewed by the home division supervisor annually as part of the PDR process. The matrixed division supports matrixed employees ES&H training efforts through direct and indirect funding as established on an annual basis. The Home division is responsible for ensuring that ES&H training needs are met.
The Matrix customer supervisor assigns the day to day work of the matrix employee and responds to assignment-related questions. For personnel matrixed to ALS, ALS is responsible for leadership in the ES&H aspects of day-to-day activities specific to the assignment. The Matrix customer refers matrixed employees to their Home division supervisor to address issues that are not directly related to the day to day tasks of the matrix assignment. The Matrix customer and Home division supervisors stay appropriately informed of and sensitive to employee issues that may be covered by collective bargaining agreements. The Home division supervisor stays in regular communication with both the Matrix customer supervisor and the matrixed employee.

Throughout the assignment, the Matrix customer and Home division supervisor talk to each other about the employee's job performance. The Matrix customer supervisor provides timely information on performance problems to the Home division supervisor. The Home division supervisor requests the primary customer supervisor to complete the expectation section of PRD. The primary Matrix customer supervisor provides comments on performance expectations and submits them to the Home division supervisor. The Home division provides the PRD to the matrix customer for review, discussion, and comment. The employee prepares the Employee Worksheet and provides a copy to both the Matrix customer and the Home Supervisor. The Home division supervisor determines the final PRD rating. When the Home division supervisor has completed the PRD, the Matrix customer supervisor initials it, acknowledging having read the PRD. The Home division supervisor reviews the PRD with the employee. The employee addresses questions or issues related to the PRD to the Home division supervisor.

The Matrix customer and Home division supervisor discuss corrective actions for performance issues relative to the matrix assignment. Performance issues or corrective actions that may be taken relative to matters outside the scope of the matrix assignment, e.g., conduct, may be discussed with Matrix customers on a need to know basis, e.g., when action taken affects delivery of service to the customer. The Home division determines and implements any disciplinary action or counseling needed. The matrixed employee interacts with the Home division management on issues related to corrective actions.

Contractors

Division management (including Principal Investigators) takes responsibility for the safety of contracted work by assuring qualified contractors are selected, hazards are identified, and work is performed safely.

ALS contractor oversight will comply with the requirements of the ISMS. In accordance with Chapter 10 of PUB-3000, the safety rights and obligations of contract employees are the same as those of LBNL employees. ALS supervisors assigned to direct the work of contract employees must provide instruction, safety equipment, and conditions equivalent to those provided to LBNL employees.

Construction work must be authorized by LBNL Facilities. The safety and health of construction subcontractor employees is the responsibility of the construction subcontractor.

All ALS employees, contractors, and participating guests are responsible for stopping work activities considered to be an imminent danger. An imminent danger is defined as any conditions or practices that could reasonably be expected to cause death or serious injury, or environmental harm. Stopping work involves:

- Alerting the affected employees and requesting the work be stopped.
- Calling the Berkeley lab emergency telephone number (x7911) and reporting the incident. The EH&S "LBNL 24/7 Emergency Notification/Contact Team, 486-6999 officer will be notified through this contact.
- Notify the immediate supervisor and ALS management and or EH&S coordinator.

IV. ES&H Committee

The Division will maintain an ES&H/QA Committee is headed by the Division Director, chaired by his representative (the Division EH&S Coordinator), and attended by at least one representative from each group in the Division, QA Representative, and QUEST team leaders. The ALS ES&H/QA Committee will meet monthly and discusses ES&H/QA problem areas and suggests improvements to the self-assessment program. The Committee discusses ES&H and QA concerns of the programs and lessons learned from them, and information on lab-wide ES&H and QA issues. Committee participation will be recorded in minutes which are distributed electronically and located on the ALS safety web page. The minutes together with action items and dissemination of any lessons learned will be distributed to all division employees through their individual QUEST team

The Committee will maintain the Division ISM, promote ES&H awareness and training, and ensure that the Division works to improve the effectiveness of the Division safety program through the safety meeting and self-assessment from the QUEST team.

This Committee will perform an annual self-assessment of all spaces within its respective jurisdiction. This assessment is described in Appendix 1.

V. Scope of the Work Authorized

The Advanced Light Source (ALS) is a national facility for scientific research and development located at the Lawrence Berkeley National Laboratory of the University of California. Its purpose is to generate beams of very bright light in the far ultraviolet and soft x-ray regions of the spectrum. Within these regions, the ALS produces the world's brightest light available as an experimental tool. This national user facility, funded by the US Department of Energy, is available to qualified researchers from industry, universities, and government laboratories.

The ALS produces light in the form of bright beams of x-rays using a synchrotron storage ring. A hair-thin beam of electrons is generated by an electron gun and accelerated to 50 MeV in a linear accelerator, and then to 1.5 GeV-1.9 GeV in a booster synchrotron. The electrons are then transferred to the 200-meter storage ring. After the 10-minute filling time, the electrons remain stored for about 8 hours. As they travel around the storage ring, the electrons emit synchrotron radiation–energy in the form of photons–, which is directed by specialized optics down 12-meter long beamlines to experiment end stations.

Since the light is produced continuously while the electrons circulate in the ring, many beamlines (presently about 40) can be used simultaneously for different experiments. This bright x ray light is used for research in materials and surfaces, combustion dynamics, protein crystallography, biological microscopy, and many other fields.

Division and Program Managers, group leaders, and supervisors (including principal investigators) are responsible for considering ES&H hazards, risks, and concerns during the work planning process and appropriate controls are determined prior to authorizing work. ALS work authorization procedures are tailored to the level of hazard of the work. General duties are authorized by the employee job descriptions and by completion of training requirements determined by the supervisor. Work recognized as posing special hazards is planned and authorized as described in PUB 3000, the ISMS, Section 1.3 of the OAP, and ALS procedures. Work authorization methods commonly utilized for ALS operations are described below:

Field Task Proposal/Agreements (FTP/As), Work For Others requests (WFOs), Cooperative Research and Development Agreements (CRADAs), and Laboratory Directed Research and Development (LDRD) documents are carefully reviewed for compliance with environment, health, and safety concerns. The conceptual design process includes documented involvement of applicable EH&S Division personnel in the review of performance and regulatory requirements, codes and standards, and EH&S criteria.

Major projects (according to DOE classification criteria) undergo a formal Operational Readiness Review (ORR) or Accelerator Readiness Review (ARR) under DOE direction. Smaller projects undergo an internal readiness review and work authorization process performed by program and Division management as described below.

For experiments or facilities that require an Activity Hazard Document (AHD), the AHD is reviewed and signed by the Division Director, ALS Division EH&S Coordinator, Principal Investigator, and EH&S Division representatives.

The hazards associated with operations at LBNL are described in the Hazards, Equipment, Authorizations and Review (HEAR) database. The HEAR database is one of the tools used by the division for defining its authorized scope of work and for identifying the hazards associated with its work activities. The database information is reviewed and updated at least annually by the ALS ES&H Administrator. Program/Project ES&H Coordinators inform the Administrator of planned changes to work scope and associated hazards.

Work requiring a Radiological Work Authorization, Sealed Source Authorization, or other EH&S permit or authorization will be performed in accordance with the authorization issued by the EH&S Division.

All modifications to the ALS personnel safety systems are authorized by the ALS Technical Safety Committee according to ALS Procedure EE 02-01. The ALS Technical Safety Committee is an ad hoc committee that also reviews and approves all changes in policies that have potential safety impact. The members of the committee are its ex-officio members, the Head of ALS Operations and the ALS Division safety coordinator, and whichever experts are technically qualified to advocate the changes and those who are qualified to approve them. The committee is convened by the ALS Division EH&S Coordinator.

New and modified beamlines at the ALS are reviewed and authorized by the Beamline Review Committee in accordance with Procedure BL 08-16.

To conduct research at the ALS, the user submits an ALS Experiment Form describing the experiment and all materials and equipment to be brought to the ALS. . The ALS uses the Experiment Form to generate an Experiment Summary Sheet (ESS) that must be completed and posted by the beamline before the experiment may begin. The ESS is used to verify that the safety and training/medical requirements are met by the equipment and users.

ALS personnel working off-site are required, at a minimum, to comply with the EH&S requirements applicable to the site at which they are working.

ALS contractor oversight will comply with the requirements of PUB-3000 and the RPM.

VI. Qualification and Training

ALS selects, assigns, and retains personnel in accordance with the RPM procedures. In selecting from a group of applicants, the Division director or Division head selects the person who, based on the evaluation of the Division director or Division head, possesses the qualifications to perform the duties of the position most effectively. In making this judgment, the Division director or Division head compares the knowledge, skills, abilities, and other qualifications of the applicants with those required for successful performance of the duties of the position. ALS contractor selection will comply with the requirements of PUB-3000 and the RPM. Effective and successful performance of duties includes performance in a manner that protects the health and safety of employees and the general public and that does not endanger the environment, as defined by the Laboratory's EH&S policies and requirements contained in the RPM, PUB-3000, ISMS, and OAP.

Each supervisor is responsible for ensuring all assigned employees whose anticipated assignment with ALS exceeds three months have completed a Job Hazards Questionnaire within the first month of employment. Whenever an employee's job assignment changes, the Job Hazards Questionnaire is reviewed to ensure that the hazards, program assignments, and safety roles entered are still valid. Annually, in conjunction with the Performance Review process, the Job Hazards Questionnaire and the employee's completion of required training is reviewed, and a training plan is developed for each employee for the next twelve-month period.

User Training

ALS Users are managed by a Group Training Record that accurately captures the records in the LBNL institutional training database. The ALS has a system that provides assurance that users receive timely, appropriate safety training. An important component of this system is an access card system. Training records are checked before card keys are issued, to ensure personnel have received essential ALS-specific safety training before they are allowed to enter the facility unescorted. In addition, ALS has a separate reception point for ALS visitors with recording of appropriate orientation training. Experiment-specific training is internally documented and tracked through experiment summary sheets that must be signed and posted at the experiment location prior to the beginning of an experiment.

VII. Balanced Resources

Principal Investigators incorporate appropriate resource allocation for ES&H concerns in all research proposals, including cost of safety equipment, permits, training, maintenance, waste disposal, and facilities modifications unless covered by institutional funding sources.

VIII. ES&H Resources

To facilitate implementation and execution of the Division ES&H Program, the following resource is matrixed from AFRD:
0.2 FTE Division ES&H Administrator
ES&H efforts are integral part of all ALS activities and are performed by all ALS personnel as needed and appropriate to the job task. The estimated level of effort is anticipated to include, but is not limited to:
$\geq$ 1.5 hr/employee/month QUEST activities
1.0 FTE safety professional.
0.2 FTE Electrical safety consultant

The following resource is made available by the EH&S Division on a matrix basis and is available to assist ALS with any aspects relating to the implementation of this Plan.
1.00 FTE ALS Radiation Technician

The matrixed individual is accountable to the Director of the Advanced Light Source.

In addition to the matrixed personnel, ALS will require support from EH&S Division professionals on an as-needed basis. EH&S estimates that direct support activities may require a level of effort of approximately 1.5 FTE, as described in Appendix I, Estimated EHS Support of ALS. ALS also expects to receive EH&S general programmatic support as described in PUB 3000, including, but not limited to, EH&S training courses.

IX. Validation, Feedback, and Improvement

ALS' primary method of assessing and validating the effective implementation of this Plan is our self-assessment process. Our self-assessment process is evaluated annually and findings are summarized in the annual ALS Self-Assessment Report. All walkthrough and QUEST action are placed on the LCATS database. LCATS completion status, trends, and root causes are summarized in the ALS Self-Assessment Report.

Additional opportunities for improvement will be identified through LBNL self-assessment activities, as described in PUB-5344, ES&H Self-Assessment Program, including Integrated Functional Appraisals, Integrated Hazard Assessments, Safety Review Committee MESH reviews, and Appendix F performance reports. If any discrepancies between authorization information provided by EH&S and records maintained by ALS are noted, these discrepancies will be discussed with the appropriate EH&S personnel and the relevant documents will be corrected or clarified as necessary. DOE, UC, and ES&H regulatory agency oversight activities may identify necessary improvements. Applicable information from the LBNL Lessons Learned program will be disseminated by the ES&H coordinator as another means to share information for accident prevention and hazard awareness.

Appendix II is the matrix of the PY2006 ALS evaluation of EH&S performance.

This Plan will be reviewed and updated annually, and may be revised more frequently as needed to facilitate compliance with regulatory and contract requirements and enhance the effectiveness of the Plan.

Advanced Light Source
Environment, Safety, and Health Management Plan

Review and Approval

Signatures:

Submitted by:

_____
Janos Kirz, Director Date
Advanced Light Source

EH&S Resource Commitment:

_____
Phyllis Pei, Director Date
Environment, Safety, and Health Division

Accepted:

_____
Steve Chu, Director Date
Lawrence Berkeley National Laboratory

APPENDIX I

Estimated EHS Support of ALS from the EH&S Division

FUNCTION	FTE EHS
Liaison - AHD Reviews Inspections (IFA, Self assess. Consultations, meetings, SAARs etc.)	.09
ALS safety support(electrical safety, Lockout-Tagout, ALS EHS Coordinator Back up, Laser safety)	.26
IH Hazard evaluations (including chemical issues, respirators, lead, noise, confined space, air quality, project support)	. 06
ORPS	.05
Waste (Includes Training and Consultations)	.01
Matrix - Rad tech support	1.00
Total	**1.47**

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